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WINCHELL, ALEX.—Conglomerates Enclosed in Gneissic Terranes. Reprint from *The Am. Geol.*, March, 1889. From the author.

WOLTERSTORFF, W. VON—Die Amphibien Westpreusses. Separatabdruck aus den Schriften der Naturforschenden Gesellschaft in Dantzig. N. F. VII., Bd. 2, Heft, 1889. From the author.

WOODWARD, A. S.—A Comparison of the Cretaceous Fish-fauna of Mt. Lebanon with that of the English Chalks. Extract from the *Ann. and Mag. of Nat. Hist.*, Oct., 1888. From the author.

General Notes.

GEOLOGY AND PALEONTOLOGY.

The Tertiary and Cretaceous of Alabama.[1]—The long sections furnished by the rivers of Alabama, have been the principal sources of our knowledge of the Cenozoic and Mesozoic geology of that State, and it is to Professor Eugene Smith, of Tuscaloosa, that we are indebted for the greater part of our recent knowledge of the subject. He gives the following synopsis of the formations included in the memoir:

Tertiary, Eocene)	Upper.	White Limestone.	Coral Limestone (?Vicksburg),	150
			Vicksburg (Oolitoidal),	140
			Jackson,	65
	Middle.	Claiborne,		140–145
		Buhrstone,		300
	Lower.	Lignitic.	Hatchetigbee,	170
			Wood's Bluff,	80–85
			Belle's Landing	140
			Nanafalia,	200
			Matthew's Landing and Naheola,	130–150
			Black Bluff,	100
			Midway,	25
Cretaceous.	Ripley,			250–275
	Rotten Limestone,			1000
	Eutaw,			300
? Cretaceous.	Tuscaloosa,			? 1000
				424

The Tuscaloosa formation (McGee) is of uncertain age, some reasons for placing it within the Jurassic system having been adduced. This is the formation which has described by some of the geologists of the U. S. Geological Survey under the name of Potomac. Mr. McGee's name, having priority by many years, must be adopted.

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[1] On the Tertiary and Cretaceous Strata of the Tuscaloosa, Tombigbee and Alabama Rivers; by Eugene A. Smith and Lawrence C. Johnson. Bulletin U. S. Geological Survey, 1887, No. 43.

The report concludes as follows (p. 138): "Thus our preliminary observations suggest the movements, and in some cases the positions, of the Cenozoic and Mesozoic shore-lines, and enable us to say that the breaks in stratigraphic and paleontologic continuity in these formations are apparent rather than real, and are due to simple and readily determinate continental movements."

Professor Smith has for many years studied and reported on the geology of Alabama, largely at his own expense. He had already planned and partly finished the explorations recorded in this report, when the U. S. Geological Survey, in the face of promises made by the director to the contrary, sent a new and inexperienced man to do the same work; a highly improper proceeding, whether viewed from the standpoint of justice or of economy. The result is the double authorship which appears on the title page, although the work was really done by Smith, Langdon and Aldrich. The only part of the report in which the views of Professor Smith were not adopted is the coloration of the geological map (p. 134). Here the Mesozoic and Cenozoic beds are colored with tints employed by all other geologists for certain paleozoic formations, in accordance with the method adopted by the present U. S. Geological Survey. This system, which reverses the coloration at present in use by other civilized nations, has no reason for existence, and has already received the condemnation of all disinterested critics. Professor Smith will issue a copy of the map with the conventional colors at some future day.

The memoir is illustrated by a large number of process-cuts of good quality.

A. Smith Woodward on Cœlorhynchus[1] Agassiz.—Among the most interesting of undetermined Ichthyodorulites are some straight, long, slender, round, ribbed spines, met with in the Upper Cretaceous and Tertiaries, and originally described by Agassiz as the rostral bones of sword-fishes under the names of Cœlorhyncus. Their dermal nature was first pointed out by Williamson, who published a detailed microscopical description; and the fragments of the fossil have since been recognized from various parts of the world.

It seems evident that Cœlorhynchus is the spine of a cartilaginous fish, that probably occupied a forward position upon the back; and, if the interpretation of Mr. Willett's fossil be correct, the genus must pertain either to the sharks or to the Chimæroids. The microscopical structure of the fossil accords with this supposition, although somewhat anomalous, and as the dorsal spines in no true shark are destitute of a smooth inserted base, Mr. Woodward refers the fish provisionally to the Chimæroids. The extinct members of the latter order do not all possess dorsal spines of the normal type observed in the living Chimæra, as shown by Dr. von Zittel's Chimæropsis; and the possibility of the problematical spines under discussion pertaining to the same group is thus rendered more worthy of consideration. In any case the name Cœlorhynchus is obviously inappropriate, as well remarked by Williamson; but it has yet to be determined whether the dentition of the same fish has not already become known under some other suitable generic title.

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[1] *Annals and Magazine of Natural History*, September, 1888.

Geological News.—Paleozoic.—R. H. Traquair (*Geol. Mag.*, Jan., 1889) compares Homosteus Asmuss, Asterolepis Hugh Miller, with Coccosteus Agassiz. The dorsal plates of the two genera correspond closely, but no undoubted remains of a ventral carapace of Homosteus have yet been found.

J. W. Gregory describes in the January number of the *Geological Magazine* a new species of Protaster from the Upper Silurian of Victoria, Australia.

Turrilepas, Woodward, first described from the Wenlock limestone and shale of Dudley (England), has been found by Mr. Arvi in the Utica formation of Ottawa, Canada. This cirripede has four rows of asymmetrical plates, with more than eight plates in a row.

Echinocaris whidbornei and *Beyrichia devonica* are added to Devonian fossils by Prof. T. R. Jones and Dr. H. Woodward. Both are Entomostraca. (*Geol. Mag.*, Sept., 1889.)

Mr. R. Etheridge has sent forth a catalogue of the fossils of the British Islands, stratigraphically and zoologically arranged. The first volume contains the paleozoic forms. In the preface to his catalogue Mr. Etheridge gives some interesting figures. In 1822, only 752 extinct species of all classes in the animal and vegetable kingdoms were known and described. In 1854, 1,280 genera and 4,000 species were catalogued by Prof. J. Morris; at the close of 1874, 13,300 forms had been described, and for the most part figured; and now the census of the British Fossil Fauna and Flora comprises 3,750 genera and 18,000 species, all recorded in monographs and serial works. The species included in this volume, ranging from the Cambrian to the close of the Permian, amount to 6,022, and are included in 1,588 genera.

Devonian.—In the transactions of the New York Academy of Science, Prof. Newberry publishes a brief description of a series of fossil fish from the lenticular calcareous concretions in the top of the Erie shale in the Valley of the Cuyahoga, near Cleveland, Ohio.

1. *Cladodus* n. sp., a shark six feet or more in length, and with a diameter of body of about eight inches.
2. Actinophorus, nov. gen., a long slender ganoid, and *Actinophorus clarkii*, n. sp., a slender fish about two feet in length by two and a half inches diameter at the pectoral fins.
3. *Dinichthys curtus ;* of medium size.
4. *Dinichthys terrelli* (*?*) Newb.
5. *Dinichthys tuberculatus*, n. sp.

At a meeting of the New York Academy of Sciences, April 16, 1888, Professor Newberry described at length a species of Rhizodus found in the mountain limestone at Alton, Ill., which evidently represents a species of Rhizodus much like *R. hibberti* Ag., which he named *R. anceps*.

Mesozoic.—Mr. R. Lydekker describes and figures in the September issue of the *Geological Magazine* an imperfect left pectoral paddle of *Ichthyosaurus intermedius* showing traces of the integuments. Such specimens are very rare.

The British Museum has recently acquired a remarkably well-preserved female specimen of *Rhinobatus bugesiacus*, the gigantic ray from the lithographic shales of Bavaria. It is about five feet long, and complete in all important respects.—*Geol. Mag.*, Sept., 1889.

M. A. F. Mariori describes *Deliostrobus sternbergii*, a new genus of Tertiary Coniferæ.—*Ann. Sci. Geologiques*, 1889.

Mr. J. Carter, in describing *Palæga mccoyi* (*Geol. Mag.*, May, 1889) states that up to date scarcely thirty fossil species of Isopoda are known to science. The new species occurs in the Cambridge upper greensand.

A new form of Pinna, another of Prodromus, and the echinid *Eodiadema granulata*, are added to the fossils of the Lias by Mr. E. Wilson and W. D. Crick.—*Geol. Mag.*, July, 1889.

According to *Petermann's Mitteilungen*, Prof. A. Wichmann found upon the small island of Saniamo, off the coast of Timor, numerous mud volcanoes ; and on that of Rotti, at the southwest end of Timor, he discovered, in two mud volcanoes, some ammonites and belemnites, the first Jurassic fossils yet found in the archipelago.

Dr. Rüst (Palæontographia, 1888,) describes the radiolarians that have been found in Cretaceous strata. In Germany these organisms are very abundant in some of the lower beds, though scarce in the higher. From the Cretaceous and Jurassic of Germany 165 species, in 74 genera, are now known.

Cretaceous.—Smith A. Woodward has published a Synopsis of the Vertebrate Fossils of the English Chalk. As a result of observation and comparison, he gives fifteen species of Reptilia, and eighteen Pisces. Of the latter, twenty-three belong to the order Selachii, eight to the Chimæroidei, twelve to the Ganoidei, thirty-six to the Teleostei, and two doubtful.

M. Paul Levy (*Ann. Sci. Geo.*, 1889) contributes a memoir upon the phosphates of France and other countries, including an account of recently discovered beds, and notes upon their uses in agriculture, and their assimilation by plants. Phosphates occur in the oldest rocks, in sedimentry strata, and in metamorphic beds. They have been found in the Archean of Canada, in Estremadura (Spain), in Norway, at Caylux, Lot, etc., in France; in all these cases under the form of apatite. The beds most worked in France are the Lias, lower Cretaceous, and upper beds of the Mesozoic era. M. Levy believes that the infiltrating water which has separated the phosphates from the carbonates is of interior origin, and has worked from below upwards, and in this belief he differs from many geologists, both French and English. The excavations made in the chalk by the waters have, in M. Levy's opinion, been filled by the descent of superior beds.

M. H. Lasne has contributed to the Annals des Sciences Geologiques for the current year a description of the geology of the department of Indre, with a map showing the geological structure. This region, which furnishes abundant phosphates, is interesting from the number of stages that can be observed in a limited space. There are ancient and eruptive crystalline rocks, Triassic and Rhaetic, Sinemurian, and Lias (rich in vertebrates and molluscs). The phosphates of the Lias of this department are in reality composed of fluo-phosphate of a composition identical with that of apatite—$CaFl_3$ (P_5, $3CaO$). He assumes that these materials were dissolved in the Liassic sea, and were deposited at the same time with the carbonate of lime by the departure of the carbonic acid. Above the phosphate-bearing Lias lie the Toarcian, Bajocian, and Bathonian, and Tertiary strata of Eocene and Miocene date, as well as in some places Pleistocene beds.

The first volume of a Catalogue of the Fossil Fishes in the British Museum, by Mr. A. S. Woodward, has recently been issued. It contains nearly five hundred pages, 17 plates and 15 wood-cuts, and is really a systematic work upon the extinct Elasmobranch fishes. These fishes are divided into the two orders Ichthyotomi (Cope) and Selachii. In the former are included the families Pleuracanthidæ and Cladodontidæ. Thirteen generic names are grouped in the genus Pleuracanthus. The Spinacidæ are classed with the Tectospondyli, or concentric suborder of the Selachii, which has twelve families, while the Asterospondyli, or radiate suborder, has but six.

The first part of a catalogue of the fossil Cephalopoda of the British Museum, with 344 pages and fifty-one wood-cuts, is the work of A. H. Foord, F.G.S. The present volume embraces the seven families Orthoceratidæ, Endoceratidæ, Actinoceratidæ, Gomphoceratidæ, Ascoceratidæ, Potioceratidæ, and Cyrtoceratidæ, which all together are but a part of the sub-order Nautiloida.

Jurassic.—R. Lydekker (*Geological Magazine*, Decade III., Vol. VI., No. 297, p. 119, March, 1889) describes two vertebræ from the Wealden of the Isle of Wight. These specimens clearly indicate a small Dinosaur allied to the genus Cœlophysis.

Cenozoic.—M. Forsyth Major has sent to the *Comptes Rendus* an account of a bed of fossil bones discovered in Samos, and of Lower Pliocene age. Among the mammals are many specifically identical with those of Pikermi, in Attica, Baltavar, in Hungary, and Maragha, in Persia; but there are also some new types, among them an Orycteropus, the only species yet known outside of the Ethiopian region; a large pangolin, estimated to be nearly three times the size of the West Africa *Manis gigantea;* and a ruminant referred by the author to the Giraffidæ, and stated to connect Helladotherium with the existing giraffe. There is also a large ostrich.

E. T. Newton describes (*Geol. Mag.*, Jan. 7, 1889) *Clupea vectensis* from the Ogliocene strata of the Isle of Wight.

Prof. W. Dames has described in the Proceedings of the Berlin Society of Natural Sciences a new kind of sawfish from the Eocene of Birket-et-Qurun, in Egypt. The rostral teeth of this *Amblypristis cheops* differ from those of the existing Pristis in their shortness and great relative breadth.

The Marquis G. de Saporta (*Annales des Sciences Geologiques*, 1889,) contributes an article upon the fossil plants of Aix, in Provence, studied stratigraphically and paleontologically. The plates illustrative of the shells of the Aix group accompany the memoir.

Additions to the vertebrate fauna of the Preglacial Forest Bed of the Norfolk coast increase through the rapid denudation carried on by the North Sea, and Mr. E. T. Newton has in the April issue of the *Geological Magazine* described *Cervus rectus* n.sp., and recognised the presence of *Bison bonasus*, *Phoca barbata*, the narwhal, the beluga and the porpoise.

H. H. Howorth, M. P. (*Geol. Mag.*, July, 1889) states his belief that in the mammoth age the Arctic Ocean either did not exist, or was very small, the greater portion of its area being occupied by land upon which trees would grow. The continents would therefore be united by land, and an ample bridge provided. This land area would partially account for the warmer climate.

MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—In his report on the geology of the Rainy Lake region, Dr. Lawson[2] gives a petrographical description of the rocks comprising the Laurentian, Coutchiching and Keewatin groups in the neighborhood of the above-named lake in Canada. The rocks of the Keewatin series are principally bedded traps and greenstones, altered from traps by metasomatic and dynamic metamorphism, and greenstones of clastic origin, hornblende schists and other foliated rocks. The effect of pressure is shown in the broken condition of many of the crystals in the rocks; crushed and sundered plagioclase, apatite, hornblende, leucoxene, tourmaline and quartz are all described and figured. Between the hornblende schists and the Laurentian gneisses the author recognizes phenomena which he believes to be due to contact action. If this supposition is found to be a correct one, the fact affords a striking confirmation of the view that the gneisses under the

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] Geol. and Nat. Hist. Surv. of Canada. Annual Report for 1887. Pt. F.